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(HIR.135)

REMARKS

Claims 1-29, 34, and 36-38 are all of the claims presently pending in the application. Applicants have canceled claim 35 without prejudice or disclaimer. Applicants have amended the claims to define the claimed invention more particularly. Applicants have added claims 36-38 to claim additional features of the invention and to vary the protection for the claimed invention further.

Claims 1-3, 10-17, 19-23, 25-29, 34, and 35 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Smith, et al. (U.S. Patent No. 6,851,835; hereinafter "Smith") in view of Hecht (U.S. Patent No. 6,871,993). Claims 4-9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Smith in view of Hecht and further in view of Young (U.S. Patent No. 6,672,741). Claim 18 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Smith in view of Hecht and further in view of Lowery (U.S. Patent No. 5,959,316). Claim 24 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Smith in view of Hecht and further in view of McCullough, et al. (U.S. Publication No. 2004/0252502; hereinafter "McCullough").

Applicants respectfully traverse these rejections in the following discussion.

I. THE CLAIMED INVENTION

The invention of claim 1, for example, is directed to a light emitting apparatus that includes a solid-state light emitting element, a power supply member that supplies power to the solid-state light emitting element, a reflection section that is disposed opposite to a light extraction surface of the solid-state light emitting element to reflect light emitted from the solid-state light emitting element, a heat radiation member that is disposed with a heat

radiation width in a back direction of the solid-state light emitting element, and an insulating layer disposed between the power supply section and the heat radiation section. The heat radiation member includes a planar member disposed parallel to a light extraction direction of the light emitting apparatus, and the power supply member, which is separate from the heat radiation member, is secured to an end face of the planar member. Additionally, the solid-state light emitting element is mounted on the end face of the planar member. (Application at page 11, lines 23-25, page 12, lines 10-11, page 13, lines 16-21 and page 14, lines 8-12).

This structure is important because the planar member alone can prevent the blocking of light that is emitted from the light emitting element. Further, because the power supply section is formed along a bottom of the planar member, the invention has the effect that the heat radiation section can efficiently radiate heat generated from the power supply section during the operation of the light emitting element. In addition, since the power supply section is insulated from the heat radiation section by the insulation layer disposed therebetween and the heat radiation section (planar member) elongates in the height direction of the apparatus, a steep heat gradient can be formed in the height direction, i.e., between the power supply section and the top of the heat radiation section (planar member), so that the heat generated from the power supply section (lead) can be more quickly transmitted through the heat radiation section (Application at page 2, lines 25-28 and page 14, lines 8-20)

In a conventional light emitting apparatus, as described in the Background of the present application, if the size of a power lead is increased to cope with increased heat generation from the light source, the light emission efficiency is decreased due to blockage of the light by the enlarged power lead (Application at page 2, lines 17-24).

In contrast, an exemplary aspect of this invention may provide for dissipation of heat

from the light source without interfering with light emission (Application at page 14, lines 7-21).

II. THE PRIOR ART REFERENCES

A. The Alleged Combination of Smith and Hecht

The Examiner alleges that one of ordinary skill in the art would have combined Smith with Hecht to teach the claimed invention of claims 1-3, 10-17, 19-23, 25-29, 34, and 35. Applicants submit, however, that, even if combined, the alleged combination of references would not teach or suggest each and every feature of the claimed invention.

That is, the alleged combination of references does not teach or suggest, “*the solid-state light emitting element is mounted on the end face of the planar member*”, as recited in claim 1, and similarly recited in claims 2, 14, and 29.

Smith fails to teach or suggest that “the solid-state light emitting element is mounted on the end face of the planar member” as recited by the amended claims 1-2, 14 and 29.

As shown in FIG.1A of Smith, five solid-state light emitting elements (50) alleged by the Examiner are mounted on a power supply member (30) alleged by the Examiner. However, in FIG.4 of Smith, no solid-state light emitting element (50) is shown and, instead, only a numeral (20) defined as a focal point (column 5, lines 40-43) is shown on the left side of the power supply member (30), where it should be noted that the focal point (20) does not mean a body of the solid-state light emitting element (50). In other words, no description or illustration of Smith exists for indicating where the body of the solid-state light emitting element (50) is positioned in the depth direction of FIG.4. For example, FIG.7 of Smith shows eighteen heat sinks (i.e., heat radiation members) (40) whereas FIG.1A thereof shows

the five solid-state light emitting elements (50) mounted on the power supply member (30). In view of these examples, Smith does not teach where the body of the solid-state light emitting element (50) is positioned relative to the heat radiation member (40). Meanwhile, the Examiner alleges that “the light source section is mounted on the end face of the planar member (Figure 4; column 8, lines 58-66)” (Office Action dated June 24, 2008 at page 3). However, Smith at column 8, lines 58-66 does not teach the positional relationship between the solid-state light emitting element (50) and the heat radiation member (40). At this part, it is stated only that the heat radiation member (40) is mounted to the rear of the power supply member (30).

In contrast, the invention can have the effect that light emitted from the solid-state light emitting element and then reflected on the reflection section can be prevented from being shaded or blocked by the heat radiation member as much as possible since it is mounted on the end face of the heat radiation member. Smith does not address even this issue.

Hecht also fails to teach or suggest that “the solid-state light emitting element is mounted on the end face of the planar member” as recited by the amended claims 1-2, 14 and 29. Hecht also does not address the above issue.

In addition, Hecht fails to teach or suggest that the planar member is disposed parallel to a longitudinal direction of the power supply member for supplying power to the solid-state light emitting element. Indeed, Hecht is silent about details of a power supply member for supplying power to the solid-state light emitting element. For example, Hecht teaches only a flexible printed circuit board (“PCB”) as a substrate (26) for mounting LEDs (16) (column 2, lines 39-45). Here, it is well known to one of ordinary skill in the art that a PCB is composed of an insulative substrate and plural conductive interconnects formed on the substrate (See,

e.g., URL: <http://encyclopedia.thefreedictionary.com/Printed+circuit+board>). Thus, it is clear that the power supply member taught by Hecht is not the entire PCB (26) but the interconnections, alone, on the PCB (26) since the insulative substrate of the PCB (26) does not serve to supply power to the solid-state light emitting element. Furthermore, it is well known that the interconnections disposed on the PCB may be formed lengthwise, crosswise and, in some cases, obliquely patterned rather than linear. Especially, the LEDs (16) of Hecht are arranged zigzag as shown in FIG.1. Therefore, the interconnections disposed on the PCB (26) must be arranged zigzag or so along the zigzag-arranged LEDs (16). In other words, the interconnections (i.e., the power supply member for supplying power to the solid-state light emitting element) are arranged at least non-linear relative to the LEDs (16) (i.e., the solid-state light emitting element). In this condition, nobody can determine which direction of the power supply member is its longitudinal direction. Thus, Hecht fails to teach or suggest that the planar member is disposed parallel to a longitudinal direction of the power supply member.

Moreover, with respect to claim 13, the Examiner alleges that Smith teaches “a heat radiation plate that transfers the heat through the heat radiation support (Figure 7)” (see Office Action dated June 24, 2008 at page 5). Applicants submit, however, that Figure 7 does not illustrate a heat radiation support or a heat radiation plate. Additionally, the passage relied upon by the Examiner does not even mention a heat radiation support or a heat radiation plate. If the Examiner wishes to maintain this rejection, then Applicants submit that the Examiner must provide reference numbers for the specific features of Smith that he is analogizing to the heat radiation support and the heat radiation plate of the claimed invention.

With respect to claims 19, 20, and 23, the Examiner alleges, “It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the width of

the heat radiation section, the width of the light emitting element, or the power level, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.” (See Office Action dated June 24, 2008 at page 7).

Applicants submit, however, that the Examiner has not met his burden of proof with respect to claims 19, 20, and 23.

That is, the MPEP provides that “[a] particular parameter must first be recognized as a result-effective variable, i.e., **a variable which achieves a recognized result**, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation” (MPEP at §2144.05) (emphasis added). The Examiner has not even attempted to establish the parameters recited in claims 19, 20, and 23 as result-effective variables. Indeed, the Examiner’s rejection does not include this first step in the analysis.

Moreover, the alleged combination of references does not teach or suggest, “*the power supply member, which is separate from said heat radiation member, is secured to an end face of the planar member*”, as recited in exemplary claim 1, and somewhat similarly recited in exemplary claims 2, 14, and 29.

The Examiner alleges that Smith teaches a power supply member 30 mounted to planar member of the heat radiation member 40 (see Office Action dated June 24, 2008 at page 3). The Examiner’s allegation, however, is incorrect.

Indeed, Smith merely teaches a heat sink 40 mounted onto a rear surface of the PC board 30 (see Smith at Figure 4, and column 8, lines 58-63). The PC board 30 is not mounted on an end face of the heat sink 40.

In the claimed invention, the power supply member is secured to an end face of the

planar member. Accordingly, since the end face of the planar member has a reduced area (e.g., see exemplary dependent claims 37 and 38), stray light can be reduced (e.g., see Application at page 14, lines 10-21).

Therefore, Applicants submit that, even if combined, the alleged combination of references would not teach or suggest each and every feature of the claimed invention. Accordingly, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

B. The Secondary References

The Examiner alleges that one of ordinary skill in the art would have combined Young with Smith and Hecht to teach the claimed invention of claims 4-9. Furthermore, the Examiner alleges that one of ordinary skill in the art would have combined Lowery with Smith and Hecht to teach the claimed invention of claim 18. Still further, the Examiner alleges that one of ordinary skill in the art would have combined McCullough with Smith and Hecht to teach the claimed invention of claim 24. Applicants submit, however, that, even if combined, the alleged combination of references would not teach or suggest each and every feature of the claimed invention.

That is, claims 4-9, 18, and 24 are allowable at least based on similar reasons to those set forth above, in section A, with respect to claims 1-3, 10-17, 19-23, 25-29, 34, and 35.

Therefore, Applicants submit that, even if combined, the alleged combination of references would not teach or suggest each and every feature of the claimed invention. Therefore, Applicants respectfully request the Examiner to withdraw this rejection.

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III. NEW CLAIMS

Applicants have added new claims 36-38 to claim additional features of the invention and to vary the protection for the claimed invention further. These claims are independently patentable because of the novel and nonobvious features recited therein.

Applicants submit that new claims 36-38 are patentable over the cited prior art references at least for analogous reasons to those set forth above with respect to claims 1-29 and 34.

IV. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicants submit that claims 1-29, 34, and 36-38, all of the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. Applicants respectfully request the Examiner to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, Applicants requests the Examiner to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

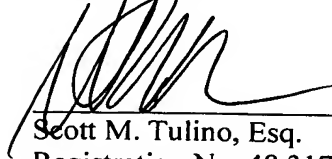
The undersigned authorizes the Commissioner to charge any deficiency in fees or to

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credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

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Respectfully Submitted,



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